REMARKS

Claims 25-72 are pending. By this Amendment, claims 26, 38, 41, 50, 54, 61, and 62 are amended.

Claims 26, 38, 50, and 62 are amended to recite that the metal alloy layer includes silicone of not less than 0.2% by weight and not more than 2% by weight. Claims 41, 54, and 61 have been amended to remedy minor informalities.

Claims 25 and 26 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Copetti et al. in U.S. Patent Application Publication No. 2001/0017770. This rejection is respectfully traversed.

Claims 25-28, 30-32, 35, 36, 49-52, 54-56, 59, and 60 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirose et al. in U.S. Patent No. 6,122,170 in view of Boutin et al. in U.S. Patent No. 4,222,774. Claims 29, 33, 34, 53, 57, and 58 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirose and Boutin, and further in view of Auran et al. in U.S. Patent No. 6,153,025. Claims 37-40, 42-44, 47, 48, 61-64, 66-68, 71, and 72 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirose and Boutin, and further in view of Yoshida et al. in U.S. Patent No. 5,213,877. These rejections are respectfully traversed.

Claim 25 recites "a metal alloy layer consisting mainly of aluminum bonded by direct bonding on at least one surface portion of the ceramic substrate board." At page 1, paragraph 0008, Copetti discloses a thin-film circuit on a substrate of an insulating material. Copetti, as shown in every figure, also teaches a barrier layer (element 8 in Figures 1-5) provided between the substrate and the first structured electrically conducting layer. Paragraphs 0067-0075 explain three embodiments of Copetti; each embodiment teaches providing a structured barrier layer 8 on a substrate 1. Copetti therefore does not teach the "metal alloy layer consisting

mainly of aluminum bonded by direct bonding on at least one surface portion of the ceramic substrate board" recited in claim 25.

Also regarding claim 25, neither Hirose nor Boutin contain any suggestion that they be combined in the manner suggested in the Office Action. Even if combined, the cited references would not meet claim 25 because neither Hirose nor Boutin teach or suggest the insulating substrate board of claim 25, wherein "a metal alloy layer consisting mainly of aluminum bonded by direct bonding on at least one surface portion of the ceramic substrate board." At column 6, lines 55-61, Hirose teaches that "conductive layer [8] is formed by first forming a layer containing metal having high melting point or an active metal on the side of ceramic base plate 1, and a thin second layer such as a plating layer, mainly containing metal such as Cu, Ni or Ag is formed thereon." The conductive layer 8 of Hirose is formed of two layers, the second layer of which mainly contains metal such as copper, nickel, or aluminum. At column 9, lines 5-15, Hirose again teaches that conductive layer 8 can be formed of copper, nickel, or aluminum but does not disclose the composition of the first layer. The metal layer of the fixing portion disclosed at column 9, lines 13-15, is metal layer 2, which is a buffer layer for the clamping stress at the fixing portion (refer, for example, to Figure 1 and column 6, lines 47-51). Hirose thus does not teach or suggest that the first layer that contacts the ceramic base plate is mainly aluminum. Boutin is directed to an aluminum alloy and also does not teach or suggest the insulating substrate board of claim 25. Therefore, neither Hirose nor Boutin teaches or suggests "a metal alloy layer consisting mainly of aluminum bonded by direct bonding on at least one surface portion of the ceramic substrate board," as recited in claim 25.

Claim 25 further recites that the Vickers hardness of the metal alloy layer is not less than 25 and not more than 40. The cited references also do not teach or suggest an insulating substrate board for a semiconductor, wherein the Vickers hardness of the metal alloy layer is not less than 25 and not more than 40, as recited in claim 25.

Claim 25 was rejected under 35 U.S.C. §§ 102(e) and 103(a). For the reasons set forth above, claim 25 is allowable over the cited references. Claims 26-36 depend from claim 25 and are allowable at least for these reasons. The various rejections to claims 26-36 are traversed but not expressly argued in view of the allowability of the underlying base claim.

Claim 37 recites an insulating substrate board for a semiconductor comprising a ceramic substrate board and a metal alloy layer consisting mainly of aluminum bonded through a brazing material layer on at least one surface portion of the ceramic substrate board, wherein the Vickers hardness of the metal alloy layer is not less than 25 and not more than 40. The cited references of Hirose, Boutin, and Yoshida do not contain any suggestion that they be combined in the manner suggestion. Even if combined, the cited references would not meet the claims. As described above with reference to claim 25, Hirose does not teach or suggest that the first layer of Hirose that contacts the ceramic base plate, and thus that is bonded through a brazing material layer on at least one surface portion of the ceramic substrate board as recited in claim 37, is mainly aluminum. Rather, Hirose's conductive layer 8 is formed of two layers. Hirose therefore does not teach or suggest the insulating substrate board of claim 37, wherein a metal alloy layer consisting mainly of aluminum is bonded through a brazing material layer on at least one surface portion of the ceramic substrate board. Additionally, none of the cited references teach or suggest an insulating substrate board for a semiconductor, wherein the Vickers hardness of the metal alloy layer is not less than 25 and not more than 40.

Therefore, claim 37 is allowable over the cited references. Claims 38-48 depend from claim 37 and are allowable at least for these reasons. The various rejections to claims 38-48 are traversed but not expressly argued in light of the allowability of the underlying base claim.

Claim 49 recites a power module comprising a ceramic substrate board and metal alloy layers consisting mainly of aluminum bonded by direct bonding on both surfaces of the

ceramic substrate board. As set forth above with respect to claim 25, neither Hirose nor Boutin teaches or suggests a metal alloy layer consisting mainly of aluminum bonded by direct bonding on at least one surface portion of the ceramic substrate board. If the references do not teach or suggest a metal alloy layer consisting mainly of aluminum bonded by direct bonding on *at least one* surface portion of the ceramic substrate board, the references also do not teach or suggest a ceramic substrate board and metal alloy layers consisting mainly of aluminum bonded by direct bonding on *both* surfaces of the ceramic substrate board, as recited in claim 49.

Therefore, claim 49 is allowable over the cited references. Claims 50-60 depend from claim 49 and are allowable at least for these reasons. The various rejections to claims 50-60 are traversed but not expressly argued in view of the allowability of the underlying base claim.

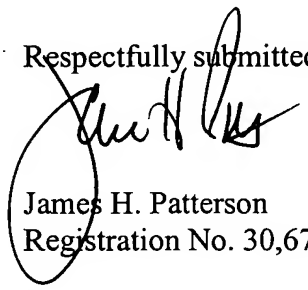
Claim 61 recites a power module comprising a ceramic substrate board, metal alloy layers consisting mainly of aluminum bonded through a brazing material on both surfaces of the ceramic substrate board, a metal base plate bonded to one of the metal alloy layers, and a semiconductor tip formed on one of the metal alloy layers, wherein the Vickers hardness of at least said one metal alloy layer is not less than 25 and not more than 40. Even if combined as suggested, the cited references would not meet claim 61. The Office Action asserts that the metal film of Hirose disclosed at column 9, lines 15-25, is "the same as the claimed 'metal base plate.'" Hirose, however, discloses that the metal *film* is formed on the surface of the ceramic base plate that faces the heat radiating *plate* 5, and thus uses the terms "film" and "plate" in different ways. Even if the claimed metal alloy layer is the same as Hirose's metal film, Hirose still does not teach or suggest a metal base plate *bonded* to one of the metal alloy layers because Hirose's heat radiating plate 5 is fixed to the power module by a bolt 4, as illustrated in Figure 1. The cited references also do not teach or suggest the Vickers hardness of at least said one metal alloy layer is not less than 25 and not more than 40, as recited in claim 61.

Therefore, claim 61 is allowable. Claims 62-72 depend from claim 61 and are allowable at least for these reasons. The various rejections to claims 62-72 are traversed but not expressly argued in light of the allowability of the underlying base claim.

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



James H. Patterson
Registration No. 30,673

Customer No. 24113
Patterson, Thuente, Skaar & Christensen, P.A.
4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100
Telephone: (612) 349-5741